RobotPHONE: RUI for Interpersonal Communication

Juried Exhibit

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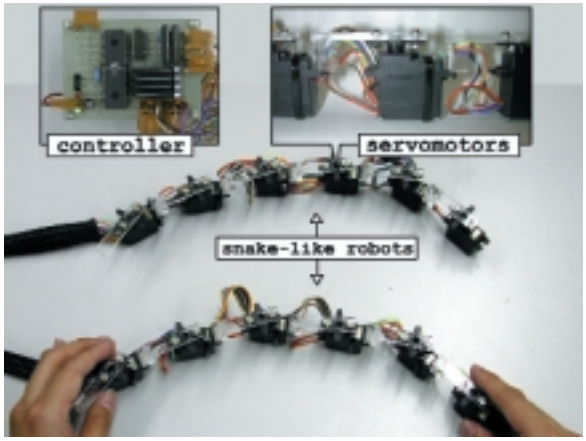
For a long time, robots have been imagined as industrial machines that perform work that humans want to avoid. However, considering the characteristics of their physical embodiment, robots can also be recognized as interfaces for human beings. Using a robot as an interface between the real world and the information world can be referred to as a robotic user interface (RUI). Other good examples include: intelligent robots that act as artificial-intelligence agents and haptic-feedback robot arms used in VR systems.

RobotPHONE is an RUI system for interpersonal exchange that uses robots as shape-sharing agents for physical communication. The shape and motion of remote shape-sharing devices are always synchronized by a symmetric bilateral control method. Robot movements, such as modification of posture or the input of motion, are reflected to the remote end in real time. RobotPHONE users can communicate and interact with each other by exchanging the shape and motion of the robot.

An initial prototype based on the RobotPHONE concept has two snake-like robots for a shape-sharing device. Each snake-like robot has six parallel axes, which form a right angle with the long side of the snake's body. Therefore, range of body movement is limited to the 2D plane, but the body itself represents a shape that can be easily modified by hand.

To make the system more user-friendly for everyone, a second RobotPHONE system that looks like a teddy bear was integrated with a voice-communication system. When users communicate with this system, the teddy bear acts as a physical avatar, so it was very important to give the teddy bear-like robot a shape and a system of degrees of freedom that are very similar to human characteristics. Since users can treat the teddy bear-like robot just like an ordinary teddy bear, this system is very easy to use. If users move the teddy bear's head, hands, or legs, the movements are transmitted to the opposite side. Just as the teddy bear placed in front of the user is an input device, it is also a display device that displays the status of the remote robot. In other words, while each teddy bear acts as an avatar of the user who sits in front of it, it also seamlessly acts as an avatar of the user at the remote side. A mother giving her daughter a stuffed doll to keep her company at night is a form of communication aided by a physical entity. RobotPHONE allows this kind of remote communication not by attempting to transmit users but rather a virtual substitute on their behalf.



Snake-like robots and controller.

Teddy bear-like robots.

Movements of shape-sharing devices.